Carousel

Technical Field

The present invention discloses teachings in the technical field of electromagnetism and more specifically the interaction of magnetic, paramagnetic, and diamagnetic materials with a plurality of electromagnetic parts stylized in analog fashion using disconnected contact plates arranged in a circumferential direction to keep timing, while utilizing an interrupted voltage source to conserve energy while isolating advanced structural principles to form a path of least resistance, which creates rotational motion effect.

“With great thanks to the late professor Erik Laithwaite and his impeccable teachings at the Imperial College of London.”
~john

Background of the invention

The use of magnetism and electromotive force has been prevalent in our society for over a century. The initial use of magnetics comes from ancient times and the discovery of lodestones (Fe3O4) which were not understood in mainstream society.

Electromagnets are a type of magnet where the magnetic field is produced by an electric current. The magnetic field collapses when the potential is alleviated. Electromagnets are widely used in various applications, such as electric motors, generators, relays, magnetic separation and thousands of other mainstream applications in today’s global society.

Electromotive Force (EMF)

Electromotive force, often abbreviated as EMF, is the voltage generated by a source, such as a battery or an inductor. It is the force that drives electrons through a circuit, creating an electric current. EMF can be induced by changing magnetic fields, which is the principle behind transformers and many types of electrical generators.

The device utilizes angular momentum from the architectural attributes of the internal channels and gradient pockets which the electromagnetic fields interact with.

Scientific Carousel Mechanism

A scientific carousel can be used in various applications, such as material testing, centrifugation, and laboratory automation. The teachings off a brief description and exemplify how electromagnets, EMF, motors, and gears are integrated into such a system:

Electromagnets

Electromagnets are used for precise control and manipulation within the carousel system.

- **Positioning and Control**: Electromagnets can be employed to hold or release samples at specific positions within the carousel.
- **Magnetic Bearings**: Reduce friction and wear by levitating the rotating components.

Electromotive Force (EMF)

EMF is essential for powering the motor and controlling the rotational speed of the carousel.

- **Induced EMF**: Generated in coils as they rotate through a magnetic field, which can be used to measure and control the speed and position of the rotating platform.

- **Power Supply**: The primary source of EMF, supplied by an external power supply unit, drives the carousel.

Motors

The motor is the primary component that converts electrical energy into mechanical rotational energy.

- **DC Motors**: Provide controlled, adjustable speed for rotatry use . These motors rely on EMF and electromagnets to create rotational motion.
- **Stepper Motors**: Offer precise control over the rotation angle, useful in applications requiring exact positioning.

Gears

Gears are used to transfer and modify the rotational motion from the carousel to external hookup.

- **Interchangeable Gear Ratios**: Adjust the speed and torque supplied by rotating platform. High gear ratios can increase torque while reducing speed, or vice versa.
- **Transmission Efficiency**: Ensures minimal energy loss and smooth operation.

Example: Laboratory Centrifuge

A laboratory centrifuge is an excellent example of a scientific carousel mechanism. It uses the principles discussed above to separate substances of different densities.

1. **Motor and EMF**: The motor, driven by an EMF source, generates rotational motion. DC motors or variable frequency drives (VFDs) are often used for precise speed control.
2. **Gears**: The motor's rotational energy is transmitted to the centrifuge rotor or a peripheral gear system.
3. **Electromagnets**:

- **Magnetic Bearings**: Used to reduce friction and wear by levitating the rotor.
- **Fixed Magnets** accomplish the same effect of levitating the head to reduce weight load and torque required for turning.
- **Control Systems**: Electromagnets can be used for precise rotary characteristics.

4. **Speed and Position Sensors**: External power supplies can use the principles of EMF to monitor the carousels speed and position, ensuring precise control and safety.

Applications

1. **Material Testing**: Scientific carousels can rotate samples at high speeds to test material properties like tensile strength and fatigue.
2. **Centrifuge**: Used in laboratories to separate components of a mixture based on density by spinning them at high speeds.
3. **Automation Systems**: Carousels can be part of automated systems for handling and processing samples, utilizing precise rotational control.

Summary

A scientific carousel leverages electromagnets, EMF, motors, and gears to achieve controlled rotational motion. Electromagnets provide precision in positioning and control, EMF powers the system, motors convert electrical energy to mechanical energy, and a peripheral gear or central drive shaft optimize the transfer of this energy. These principles are critical in applications like material testing, centrifugation, automated laboratory, and robotic systems.

Brief Description of the Invention

The invention titled Carousel is a cylindrical or disc shaped rotary engine powered by electromagnetism, designed for durability and efficiency. It consists of four main modules: the base plate module (1), the mounting plate module (2), the head module (3), and the cap module (8).

Base Plate Module (1)

The base plate module (1) is the foundational structure of the Carousel, made preferably from non-conductive materials that are non-reactive to electromagnetism, but should be durable and suited for the application. It houses the electromagnet modules (5), which are arranged in concentric rings and spaced equidistantly to ensure uniform magnetic interaction. Each electromagnet module (5) is equipped with an electric terminal module (15) which is comprised of terminals, conductive material such as wire and attachment parts, this piece connects to the power supply and generates the necessary electromagnetic fields when the contact plates interact with the terminals delivering power.

Mounting Plate Module (2)

The mounting plate module (2) is a thin, disc-shaped structure that sits above the base plate module (1). It contains conductive contact plates (13) arranged in a circumferential direction. These contact plates (13) are strategically placed to align with the electric terminal modules (15) on the base plate module (1). When the contact plates (13) pass over the terminals (15), they complete the circuit and energize the electromagnets (5).

The mounting plate module (2) also features multiple channels (12) cut through it in concentric rings. These channels (12) allow the electromagnet modules (5) from the base plate module (1) to pass through unobstructed, interacting with the head module (3) above.

Head Module (3)

The head module (3) is a critical component that reacts to the magnetic fields generated by the electromagnets (5). It is slightly smaller in diameter compared to the base plate module (1) and the mounting plate module (2) to fit snugly within their peripheral edges (17). The head module (3) has gradient shoes (10) embedded inline with the channels (12), which are designed to vary in width radially as well as depth, and create a path of least resistance induced by structural principles. This variation in width and depth and other dimensional factors causes differential magnetic reactance, facilitating rotary motion.

Channels (12) are cut into the bottom side of the head module (3) in a circumferential direction. These channels align with the electromagnets (5) on the base plate module (1) and the conductive contact plates (13) on the mounting plate module (2), and are where the electromagnets are situated.

Cap Module (8)

The cap module (8) secures the head module (3) in place. It attaches to the mounting plate module (2) using fasteners through hollow cylindrical passages known as fastener shafts (9). The cap module (8) has a peripheral edge (16) that extends slightly down the sides of the head module (3), ensuring it remains securely in position. The cap module can be exchanged for gear parts or have the gearing parts attached to it by means of fastening equipment.

Operation and Function

The operation of Carousel involves the following steps:

1. **Power Supply**: When the device is powered on, the electric terminal modules (15) supply electricity to the electromagnet modules (5) on the base plate module (1) when a current passes through the contact plates and energizes the electromagnets and produces lines of flux.
2. **Contact Plates**: As the head module (3) rotates, the conductive contact plates (13) on the mounting plate module (2) pass over the electric terminal modules

(15). This intermittent contact completes the circuit, energizing the electromagnets (5). Each contact plate disengages from the plurality or singularity of electrodes before the electromagnet is introduced into the channels (12), alleviating the risk of the magnet becoming snagged or slowed by the channel embodiment(s).

3. **Electromagnetic Field**: The energized electromagnets (5) create magnetic fields that interact with the gradient pockets (11) in the head module (3).
4. **Rotary Motion**: The variations in the structural dimensions of the gradient pockets (11) and their alignment with the electromagnets (5) cause differential magnetic reactance, producing a path of least resistance and enabling rotary motion.
5. **Stack-ability**: The Carousel can be stacked with multiple units using a central shaft passing through the devices shaft cut-out (10). This configuration allows for complex mechanical operations and increased versatility in applications.
6. **Forward and Reverse Motion**: By arranging the internal components appropriately or utilizing multiple units in cooperation, the Carousel can operate in both forward and reverse directions.

Energy Efficiency and Control

The Carousel is designed for high energy efficiency, using pulses of electricity rather than a continuous flow. This intermittent power delivery reduces energy consumption and minimizes wear on the components, ensuring long-term reliability and efficiency.

The device can be controlled through:

- **Hard-wiring**: Basic units can be hardwired with conductive terminals, suitable for applications where simplicity and longevity are prioritized.
- **Programmable PCB**: For advanced applications, the Carousel can be equipped with an external a programmable printed circuit board (PCB) or integrated circuit (IC) hardware, allowing for precise timing and control of the electromagnets (5).

Detailed List of Preferred Embodiments

1. Base Plate Module
2. Mounting Plate Module
3. Head Module
4. Ports/Interface
5. Electromagnetic Module
6. Assembly
7. Track Motion Module
8. Cap Module
9. Fastener Shaft
10. Shoe
11. Pocket
12. Channel
13. Conductive Plate
14. Outer Track Module
15. Electrical Terminal Module
16. Cap Peripheral Lip
17. Mounting Plate Lip
18. Contact Plate Popout
19. Shaft Cutout
20. Fastener Locations
21. Cover
22. Outer Electric Track
23. Inner Electric Track
24. Contact Plate Punch Location
25. 90 Degree Lip
26. Mounting Plate Collar

27. Head Collar
28. Circuitry
29. Nodes
30. Inner Stability Track
31. Outer Magnetic Ring
32. Inner Magnetic Ring
33. Raised Area
34. Base Channel
35. Precision Track Module
36. Teeth
37. Head Collar
38. Case
39. Mounting Shelf
40. Varied Pocket

Detailed Description of the Invention:

The invention titled Carousel is a disc shaped or cylindrical shaped device much like an electric induction engine, however the invention is powered by electromagnetism and turns with variable speed capability dependent on configuration of embodiments and external power potential.

The design is simple and the device is created with longevity in mind. The unit is built hardwired with [15] Electric Terminal modules attached to the [5] electromagnet modules which remain inactive until contact is made by the conduction plates. The unit utilizes [13] Conductive Contact Plates which are situated on the mounting plate in circumferential direction and in concentric rings to align with the electromagnets and the electromagnets electric terminal modules which are attached to and power the electromagnets. The mounting plate which holds the conductive contact strips is designed to rotate and contact briefly the electric terminals during

revolution. Th invention itself is an analog system and is designed with the capacity to be timed by an external programmable PCB or utilizing other IC components. The invention does not require excessive maintenance. The invention is designed with few moving parts which enables the requirement of maintenance to be reduced and exhibits low wear over time, excluding the stability track system. The magnetic bearing system can be replaced with alternative embodiments, such embodiments being; castors, bearings, wheels or similar effect producing parts and can be replaced or revitalized when the magnetic charge has diminished or the physical part is worn.

As stated the analog stylized invention is power efficient due to the pulse that is generated from the electric terminals [15] contacting the conductive contact plates [13] as the contact plate [13] pass them during revolution. When contact is made from the electromagnets electric terminals [15] and the conductive contact plates [13], power is then transferred into the electromagnet(s), which are located on the base-plate module [1], as opposed to most electric powered engines or carousels where power is applied constantly while in operation. Instead of a continuous flow of electricity the disconnected contact plates [13] deliver power only when in contact with the electric terminal module(s) electrodes, which are built into the devices base-plate and are attached directly to the electromagnet modules [5] and the external voltage potential. The unit is comprised of four main modules; the base-plate module[1], the mounting plate module [2] , the head module [3] and the cap module [8].

The invention operates as such; the electromagnet modules [5] which are arranged on the base-plate module [1], equidistant to each other in circumferential direction which have the option to form a singular or plurality of circular paths inside the invention and which can arranged in concentric rings. The amount of electromagnets and circular paths they comprise may vary depending on performance and size specifications. The concentric rings or circular locations each contain at least one or more electromagnet(s) in each ring. The conductive pathways which deliver power to the device are located below the electromagnets, are attached to the electrodes, and are some of the embodiments which comprise the base plate module.

Above the base plate is the location of the mounting plate module [2] which is a thin disc that cradles and helps secure the head module [3], and is where the conduction contact plates are attached. This piece like the base-plate module [1] the mounting plate module [2] and the cap module [8] are preferably durable and sturdy and suitable for industrial and scientific applications assigned to the device. Comprising the the mounting plate are linear channels also composed in circular pathways and are of varying dimensions, and which align with the electromagnets. The composition of these channels and cutouts allow access of the electromagnets into the head module [3], which renders the mounting plate into two or more concentric disc shapes due to separation for passage of the electromagnetic modules which also will vary in dimensions and coil wrapping. The interaction of the electromagnetic modules and the gradient pockets and channels of the head module is how electromagnetic motion is created by induced EMF.

To explain further, the head module [3] is the module that reacts to the magnetic field. The cylindrical shaped or disc shaped head module incorporates channels [12] located in its bottom side which have gradient and/or poly angled interior structural details and attributes which are used for advanced electromagnetic principles of motion. When these pockets align with the electromagnets of the base plate [1] and the linear cutouts of the mounting plate [2] , the magnetic field created by the electromagnetic modules induces motion in a circumferential direction from the grades, planes and other architectural attributes comprising them, which in turn, creates the path of least resistance required, and forces the invention into motion. The electromagnets are usually positioned center-line with the channels [12] of the head module [3] above it that is attached to the mounting plate module [2], so that the electromagnets can pass freely and without obstruction. The mounting plate module [2], has matching channels to the head module [3] known as the cut-outs, and the electromagnetic modules rings, all of which are aligned to each other in a circumferential direction, rendering the mounting plate module [2] in two or more concentric disc shapes, the center disc which holds its central shaft connection embodiment, the external disc and depending on the amount of individual and

separate channels and electromagnetic module paths additional discs may exist in concentric placement to match the head modules channels [12], and the base-plate modules electromagnetic modules. The cap module [8], the mounting plate module [2] and the base-plate module [1] all have relative diameters. The head module [3] possesses slightly less of a diameter than the other three main modules due to the lips of the external edge of the mounting plate module [2] and the cap module [8], which run in circumferential direction around their outer edges and slightly encase the top and bottom corner edges of the cylindrical shaped head module which run in circumferential direction. Notches or grooves may be made in the head module with matching raised areas in the mounting plate and cap modules, or vice a versa, to offer advanced gripping potential. The edge lip [17] of the mounting plate module [2] extends up the side of the cylindrical shaped [8] head modules side slightly, due to its location below the head module. The cap modules [8] peripheral edge [16] extends down the side of the head module [3] slightly because it is located above the head module [8] which causes a tight and secure grip of the motions source when fasteners which protrude through the head module in the [9] fastener shafts are secured in place. The fastener shafts are hollow cylindrical passages that traverse through the head module [3] from top to bottom as seen in the drawings. The base plate module is the same diameter or can be slightly smaller radially as both the cap module and mounting plate module.

When the contact plate [13] contacts the electric terminal module [15], a signal is sent to the [5] electromagnetic module(s), and renders activity in the form of an electromagnetic field. This field or vector then engages the head module [3] which is affected by the electromagnetic vector and creates motion in a circular or rotary direction. The reason for this event is the shape of the gradient pockets [11], which are composed in accordance with the conductive contact plate and are shaped in gradient and varied angles or planes, located in its head, and in doing so causes a path of least resistance to occur, enabling the rotary motion desired.

The device is designed to be used with multiple units stacked upon each other, or composed with interlocking gear like situations, in plurality or can be utilized

singularly, the invention has the capacity for forward and reverse turning. As stated the invention is also designed to be used as interlocking gears for advanced robotics and industrial applications from interchangeable gear rings hat can be integrated into or attached to the cap module, the mounting plate module, the head module, or the base plate module. Due to the invention offering optional casings and optional mounting outcomes to enable intricate and custom designs, the applications available are uncountable in industry. The head module [3] offers various shapes and planes of the gradient pocket module(s) [11], and channel modules, which when altered affects the speed, torque, continuity of motion, and other aspects of drive.

Brief Description of the Drawings

Figure 1A: Orthographic view of device.

Figure 1B: Orthographic semi-transparent view.

Figure 2: Expanded view.

Figure 3A,B,C: Shows 3 orthographic angles of three various perspectives.

Figure 4A: Orthographic view of base module.

Figure 4B: Perspective view of base module.

Figure 5: Orthographic Circuit diagram.

Figure 6A,B,C: Perspective drawing of various head dimensions.

Figure 7A,B,C: Shows orthographic views of the mounting plate base plate and the complete unit.

Figure 8A,B: Orthographic views of top and bottom of mounting plate module and shows depressions and raised areas for the contact plates to inhabit.

Figure 9A,B: Orthographic views of the circuit diagram and location of electromagnetic modules.

Figure 10A,B,C: Orthographic view of stacked units.

Figure 11A,B,C: Orthographic views of various heads and contact plate lengths.

Figure 12A,B: orthographic views of gearing variations.

Detailed description of the drawings:

[0000] **Figure 1a:** Is an orthographic line drawing showing the Carousel. It calls out the [1] Base Plate Module, the [2] Mounting Plate Module and the [3] Head Module, and the cap module [8]. These are the four main modules of the invention. Also shown is the [4] interface/ports for input of the control voltage which can be relocated to alternate places when gearing is used..

[0000] **Figure 1b:** Shows the invention as transparent and shows the base plate module [1]. This part is made preferably of a durable material that is also preferably non reactive to electromagnetism. Plastics, woods and certain alloys are suitable examples for the rigid frame needed or a combination of said materials can be used but the part is not limited to only these materials. The [5] Electromagnetic Module is pointed out in their approximate locations and can be seen partially in this figure. The [5] Electromagnetic Module is what activates motion in the carousel. The gradient shoe module [10] serves as a fitting for the [3] Head Module. The Head module has channels situated in it and are arranged in a circumferential direction. The gradient shoe [10] is shown, this embodiment can be used to connect the mounting plate module too itself and is shaped variously to match the gradient pocket that is situated in the head module, and should react to the electromagnetic field. The Track modules [7] are seen in this figure and offers stability and smooth operational function as they are situated in circumferential direction on two or more separate tracks. The tracks are shown in this figure as individual and separate but can also be made in a continuous ring shape situated in a circumferential direction on the Base Plate Module and support the weight of the upper portions of the unit while enabling the carousel to turn smoothly and efficiently while being positioned in various locations to ensure stability and balance of the devices moving parts. The fastener channels [9] are shown which interlocks the mounting plate the head and the cap modules, and can be used in stacking the unit upon itself. Also shown are non limiting locations of the electromagnetic modules [5].

Figure 2: Shows an expanded view of the four major modules known as the Base Module [1], the [2] Mounting Plate Module, the Head Module [3], and the Cap module [8]. The Head Module shows approximate locations of channels embedded and gradient pockets [11]. The Pockets are an integrated part of the head and is what interacts with the [5] Electromagnet(s). The Electromagnets, which partially comprise the Base Plate Module, are fixed in place or may be clipped into an electric track also located on, and partially comprising the [1] Base Plate Module. The [19] Shaft Cut-Out is pointed to and is a hollow passage located in the center of the entire invention and allows for a central drive shaft to pass through and gives the ability to stack a plurality of inventions upon itself, and too share the same driveshaft. The [10] gradient pocket is shown. The Assembly Module is located. The Assembly Module allows for various shaped shafts to be securely attached to the Carousel, most of which would be from three sided or more depending on needs of stacked units turning in sequence for timing of the contact plates or other needs that may arise by the user. Non limiting examples of various shafts would include triangular, square, pentagon, hexagon, octagon, dodecagon.

The [2] Mounting Plate Module is shown in this expanded view. Located in this module are fastener locations [20] for mounting of the [3] Head Module to the Mounting Plate Module [2]. which also holds the [13] Conductive strip which triggers the [5] Electromagnet(s) as the [11] Pocket are in contact. The [14] Outer Track module is pointed out and is accompanied by the [30] Inner Track Module. The reverse side of [13] Conductive Plates are seen protruding through the depression and slit like opening in the [2] Mounting Plate Module and make a complete electrical circuit when both electrodes of the [5] Electric terminal module are in contact with the contact plate. This connects the power supply by connecting the open terminals comprising the [15] Electric Terminal Module which in turn enables activation of the [5] Electromagnet(s), and is how motion is created each time the conductive strip contacts the terminals. The [1] Base Plate Module located at the bottom of Figure 2 shown more clearly the approximate locations and alignment of the four main modules mentioned and also points to the [4] Ports/Interface Module and their non

limiting power connection locations. The [2] Mounting Plate Module comprises matching channels and cut out parts so that the [3] Head Module can move freely without obstruction. In this figure the mounting plate does not utilize the shoes [10] and is fastened directly to the head module at its non limiting fastener locations [20].

Figure 3a: Shows a orthographic view of the bottom of the [2] head module and approximate locations of parts comprising the [10] Shoe Module(s) and the approximate locations and the [12] Channel approximate locations , the [14] Outer Track modules approximate location and [27] Shaft collar assemblies central location. The [10] Shoe Module fits accordingly into the [11] Pocket and also attaches the [2] Mounting Plate Module to itself by creating a bridge between the three individual rings that comprise the disc shape known as the [2] Mounting Plate Module. The [10] Shoes are made of metal, alloy or alternate material that passes electromagnetism without obstruction or disfigurement of the lines of flux. Another manufacturing method includes omitting of the [10] Shoe Module(s) and fastening the three concentric discs directly to the [3] Head Module which would create zero obstruction between the electromagnet(s) and the [3] Head Module. The [10] Shoe Module, if used in fabrication comprise tab parts for attachment to the [2] Mounting Plate Module.

Figure 3b: Shows Orthographic projection of the side of the [1] Base Plate Module and the [2] Mounting Plate Module and points to three of the [10] Shoe Modules as well as locates the [7] track motion modules approximate locations in the outer track module and the inner track module and is a joinery module between the upper and lower track modules, which connect one track module to the mounting plate and the lower track module to the base plate. Also visible in this figure are the [5] Electromagnet(s) exemplary location for ease of comprehension of the drawings.

Figure 3C: Shows another orthographic view of the side and shows the approximate location of the [8] Cap Module which sized to fit the [3] head module and secure it too the device. The [8] Cap module is attached by fasteners through the

[9] Fastener Shaft(s), which are hollow cylindrical passages which traverse through the [3] Head Module and which are large enough for fasteners and may incorporate hollow cylindrical metal jackets which are inserted into the [9] fastener shafts and which reside between the fastener and the fastener shaft if the interior of the fastener shaft if is not threaded to accept a matching fasteners threading. The purpose of the fastener shafts are to connect the [2] Mounting Plate Module to the [8] Cap module and secures the [3] Head Module between the two. The most logical location for the fastener shafts and fasteners which secure the head between the cap and the mounting plate are behind the stability tracks and would need to be attached before the stability tracks installation unless a system is used where the fasteners are countersunk or flush with the stability tracks base plate, as to not obstruct the stability track motion module when a levitating magnetic track is omitted, and replaced with wheels, bearings, casters or the like physical component(s). The [3] Head Module is transparent in this figure. This figure shows the [9] fastener shafts approximate locations it also shown non limiting locations of the [8] Cap module and the exemplary location and situation of these modules and parts in respect to the [1] Base Plate Module and [5] Electromagnetic modules partially comprising it .

Figure 4A: This figure shows a perspective drawing of the base plate module [1] and non limiting locations of parts and modules. The inner magnet ring module, and the outer magnetic ring module, their situation and exemplary locations. The electromagnets do not need to be fixed to the base plate but instead a outer track module [22] and an inner electric track module [23] can be installed to make available a clip in option for addition and subtraction of electromagnetic modules by the user Also pointed to are the [7] track motion module and the outer magnetic ring, which is the circular path the electromagnetic rings follow and which are associated with the same electric circuit loop. More magnetic rings can be added in concentric direction depending on the size or performance requirements of the invention as well as the addition of more electromagnets per ring.

Figure 4B: Is a perspective view of the invention and shows the [5] electromagnet module(s) locations, the [23] inner electric track, the [22] outer electric track module and the [15] electric terminal modules and their approximate locations. The drawing shows the [5] Electromagnetic Modules and both the inner and outer electric tracks. The electric track can be attached during fabrication so adition and subtraction of electromagnetic modules can be adjusted by the user. As shown the two electrodes of each electric terminal module are not connected to the control voltage but are individually connected, and only produce electron flow when the contact plate passes above and makes contact with the two terminals of each electric terminal module individualy.

Figure 5: Shows electrical wiring located in the Base Plate Module. This is an electrical module for the device that all electronic parts are connected to and which gives power to the Carousel which creates motion by way of electromagnetic properties. Also shown are exemplary locations of nodes for connecting to electromagnetic modules. This is a basic schematic with power delivery entering from either side. The power ports can be relocated to various locations on the base plate and can also be locate on the bottom of the platter if the device is stylized in a gear format. The location of the shaft cutout is shown and is where the driveshaft passes through for stacking when utilizing a single driveshaft with a plurality of carousels. The shaft cutout is circular in shape and hollow and is the exact depth of the base plate, which offers a clear passage for the driveshaft.

Figure 6A, 6B, 6C: Shows perspective of examples of various dimensions of the [3] Head Module and the variations in mass which translate to various effects of rotation dynamics by way of electromagnetic stimulation. The variations include gauge, depths, heights overall circumference and distances from the electromagnets to the termination of the walls of the shoes and gradient parts of the head module. The long cylindrical units are heavier and may require additional magnetic bearings to compensate for weight. When utilizing a head model with greater length the electromagnetic module has the capability of extension greater than that of the

electromagnetic modules utilized in conjunction with slimmer head modules. The electromagnetic parts vary in structural dimensions and coil wrappings to accommodate a variety of head part specifications.

Figure 7A: Shows the top of the [2] mounting plate module. This module attaches to the [3] Head module and has the [7]track stability module located on it. In figure two the top side was depicted in the expanded view which is the side that is pressed against the head module for security. In diagram two, small tabs were shown which are where the ends of the electrical contact conduction plates rest. This view depicts the side where contact is made with the electrical conduits of the electrical terminal module. As we can see the contact conduction plates offer elongated area and for the electrical terminals to slide along as the mounting platter rotates. Here are seen the opposite sides of the threaded plate which are raised slightly from the depression made by the punching machine or formed in molds and where the two short walls offer the slit to pass the contact plate through. The contact strips are then threaded through the slits to secure the contact plate through and the embeddings securing the tabs snugly in them as seen in figure 2. This figure shows the Contact Strips raised area [36] which is an integrated part of the [2] Mounting Plate module, and is where the [13] Conductive plate is threaded through and where the conductive strip is located to make contact with the [15] Electric Terminals as the mounting plate module passes over and timing is created by placement of the [13] contact plates and their locations in respect to each other as the [15] electrical terminal module contacts each one. The speed of rotation is adjusted by the volume of energy released into the electromagnet(s) and delivered from external power regulation apparatus. The external power regulation apparatus is not included in the invention. The [13] conductive contact plate is in its simplest form a thin strip of conductive metal slightly bent and folded to match the raised part of the mounting plate where it rests to achieve a level where the [15] electric terminal module can make direct and effective contact to transfer the power needed too energize the electromagnet(s) repeatedly and propel the invention. The [13] contact plate is curved to match the curvature of the circular

[2] mounting plate. A total of eight conductive strip locations are shown in this figure, four are in locations to contact the outer electrical terminal path and four are located to contact the four inner electric terminal contact ring. However more or less can comprise individual units as well as variations in length too match the pockets of various head designs. Also shown in this figure are the approximate locations of the Gradient pockets [11]. The [20] Fastener Locations for the top track of the [14] Outer Track and Inner track [30] are shown, and the fastener shafts [9] are depicted in this figure. The fastener locations [20] are depicted as crosses and attach the mounting plate to the head module, while the fastener shafts [9] and are circular in shape are the hollow cylinders that attach the mounting plate to the cap module. The fastener locations can also be the locations where the stability tracks [14] and [30] are attached to the mounting plate module.

Figure 7B: Shows Orthographic projection of the [1] Base Plate Module and how it interacts with the projections of Figure 7A above it, and 7C below it. It also points to [5] electromagnetic modules and the [7] Track motion modules which comprises the tracks used for stability and too keep the invention turning smoothly and without defect. This view also points to the linear base channel [34] which is designed for securing the cover or can be used for mounting the device if no cover is attached. The base channel is a trench approximately 1/3 the height of the base plate and its depth is relatively the same distance as its height, and is where the stability track is housed.

Figure 7C: Shows the invention with a cover [21] on the base plate module the cover has a linear ridge that traverses the the inside in circumferential direction and small screws or other types of fastening hardware can be used to affix it firmly to the base channel [34] of the base plate. The Cover [21] is a thin linear piece with fasteners equidistant along the circumferential path and tighten in the linear base channel [34] located on the base plate.

Figure 8A, 8B: Shows both sides of the [2] mounting Plate Module omitting the third side or edge. The only difference is how [24] Conductive Strip Punch Location. As you can see Fig 8A shows the side that comes in contact with the [15] Electric Terminal module and is where the [13] contact plate is bent over. In Figure 8B which is the reverse side you can see the two depression points in the Mounting Plate where the [13] Conductive Strip passes through and is position in the depressions formed by the punch-out or molding. The [13] contact strip can be attached by means of fasteners, rivets, solder, adhesive or other material or process that is suitable for the connection, or the strips can be wedged in the depressions on the reverse side that is pressed against the head module, as not to become dislodged and fit snugly into place, the contact plate can be made using molybdenum or another spring material mixed into the alloy to ensure longevity of placement and function. Also Shown in these figures is the [27] Shaft Collar. This is where the eternal driveshaft fits into along with connecting through the [3] Head Module. The shaft itself can be made in a variety of shapes including triangular, square, hexagon, decagon to name a few of the many shapes with equal flat parts comprising them and what would be considered useful for grip. The usefulness of the varied shaped parts is to increase the amount of degrees the carousels fire at when stacked upon each other in succession. With additional sides to the shaft more units can be stacked on the shaft with varying degrees which in turn activate the electromagnets at different times and at various degrees located around the shafts dimensions. The shaft is secured with the [27] Collar Assembly module and also attaches to the [37] head module collar on both sides or one side of the head module. When these units are stacked on top of each other the [2] Mounting Plate Module can connect the [35] Precision Track Module to another base plate module [1] at the [38] base channel, which can be used to secure the additional units when stacked upon each other as well as securing the base plate module to the additional three main modules, the mounting plate module [2], the head module [3], and the cap module [8] for securing the unit together under heavy load, high speed, or when the unit it placed up side down, on its side or another angle that would normally dislodge the three top modules by gravity or force exerted

by the invention, or when a flat level surface is not available. Or the mounting plate can be fastened directly to an alternate mounting plate from an additional carousel and the second [3] Head will turn with no power in reverse until power is actuated and then the second wheel will be powered and the first powered which will spin the carousel in its opposite direction from its original direction as in reverse, this configuration places the base modules in juxtaposition. Many configurations are achievable with this system for power, high end speed, low end torque and other attributes of turning and can be calibrated by simply utilizing the collar to collar fastener assemblies, and create many options in regards to specific needs the user. The mounting plate lip is integrated into the mounting plate and can extend further in its 90 degree direction to adjoin the base channel [34] to the precision track module [35].

Figure 9A: Shows the basic exemplary circuitry of the [1] Base Plate Module which is used to power the electromagnets as well as exemplary locations of [29] nodes for attachment to electric track or directly to the [15] electrical terminal module(s).

Figure 9B: Shows a top view of the [1] Base Plate module and points to approximate locations of the [5] Electromagnet Module, parts [23] Inner Electric Loop/Inner Electric Track the [22] Outer Electric Loop/Outer Electric track.

Figure 10A: Shows two units facing opposite directions with the Base Plate Modules mounted on a exemplary mounting shelf [39] in the exemplary [38] case unit. The center plate is attached to the exemplary case [38]. In other situations the two Head Modules are connected by a joinery plate. This allows the two heads to spin the same direction as they are powered alternately by the two separate Base Plate Modules.

Figure 10B: Shows multiple units configured in forward and reverse positions. In this figure the three units traveling in the same direction have their base-

plates attached to cap plates and the third one is located in the opposite direction for reverse. This configuration is depicted to show the possibilities of stacking the invention upon itself repeatedly. If all of the units facing the same direction each grip the central driveshaft torque is increased, however if only the unit farthest from the mounting point of the case or a mounting point without the units being encased, and is attached to the central drive shaft and the three units facing the same direction in this exemplary situation are not attached to the central drive shaft, but instead are solely attached to the base plates of each unit from their cap modules, then speed is increased three times from each independent unit being powered independent while only the third and fastest grip the central driveshaft. This would then require a gyroscopic power transfer device that is not included in this specification, drawings or claims, but would need to be developed in an alternate patent. If four units are used the speed increases +/- four times, if five units are composed this way the speed increases +/- five times, and the more units added the more speed can be derived, while the less units the speed will be decreased until the speed is equal again to 100% by leaving only 1 unit in the configuration.

Figure 11A: Shows drawings of various heads for a variety of motion achievements. The shapes and distances become variables for the amount of current used. How the shape reacts to the magnetic field varies as does the magnetic grip. With correct shapes many possibilities exist for this unit and this type of technology. If a gradient shoe [10] is used it will be shaped accordingly to match the angles and profiles of the varied pocket [40]

Figure 11B: This head is shaped for a continuous flow of motion and would be given a contact plate that completes an almost 360 degree path with only one disconnected portion where the wide area of the pocket and the narrow area of the pocket meet. This is a less energy efficient unit but develops greater speed. When many of these elongated pockets are used in circumferential placement and staggered

so power is constantly flowing to the device, high performance capability is achieved. For an exemplary situation, if there are 6 of these pockets each separated by 60 degrees of separation , and each pocket only interacts with one electromagnetic module all placed evenly across half of the base plate in a line from the outer edge to the center shaft cutout where being six electric tracks would comprise the base plate, one track for each pocket, then 5 of the electromagnets will be discharging electromagnetic lines of flux and only one will be powered down momentarily, due to the separation of 60 degrees.

Figure 11C: This figure depicts a varied head with varied pockets [40] architecture. What is shown here is the conduction contact plates and how their distance has increased with the distance that has increased with the pockets length, in order to power the electromagnets through the entire pocket and disengage before the magnet reaches the channel [12] where it will defect from proximity to the parallel channel [12] walls.

Figure 12A,12B: Shows a varied pattern toothed gear as seen in the figure and is marked [36] Teeth. These changes can occur on the [2] Mounting Plate Module or Part No.3 Head Module, or be integrated into the [8] cap module which itself can hold toothed gearing's.

Figure 13A,B,: The top figure 13A Shows the singular unit complete and with its cover on, Below it in figure 13B the device is shown semitransparent and the base channel [34] can be seen clearly and is where the precision track [35] is mounted and used for holding the unit in together when varied modules are used or when multiple modules are stacked upon each other for high speed transfer from device to device.

Applications

The science behind this device is very simple and relies mostly on timing with hard-wiring and external electrical current control. As stated earlier the device can also be programmed with an external digital P.C.B. or with I.C. parts alone, depending on the users wants or needs. The invention itself is analog and utilizes hard-wiring however speed spikes or lags may occur over short periods of time or other timing issues may be inflicted upon the invention if proper external power delivery aparati are not utilized. The invention provides power ports for electric induction from an external power regulation apparatus. The contact plates should be made of a spring like material to afford continuous pressure upon the electrodes of the electromagnetic modules, and in turn the electrodes may be made of a similar springlike or material or stylized in a brush manner to help elongate the time needed for worn electrical connectors and defects derived from them to occur.

The versatile design of the Carousel makes it suitable for a wide range of applications, including:

- **Robotics and Animatronics**: The precise control and durability of the Carousel make it ideal for use in robotic and animatronic systems.
- **Laboratory Automation**: The device can be used in laboratory automation systems for tasks requiring controlled rotary motion, such as centrifugation and sample handling.
- **Industrial Machinery**: The energy-efficient and low-maintenance design of the Carousel makes it suitable for various industrial applications, where reliable rotary motion is required.

Conclusion

The Carousel offers a robust and energy-efficient solution for applications requiring controlled rotary motion. Its unique design leverages the principles of electromagnetism and archetype attributes to provide reliable and long-lasting performance, making it a valuable component in modern mechanical and electronic systems.

This expanded description uses the numbering system to refer to the different parts of the invention, providing a clear and detailed non limiting explanation of the Carousel.

The Carousel overcomes several key problems that are commonly encountered in traditional rotary engines and similar devices. Here are some of the main issues it addresses:

1. Energy Efficiency

- **Problem**: Traditional rotary engines and carousels often require a continuous flow of electricity, leading to high energy consumption.
- **Solution**: The Carousel utilizes intermittent power delivery through conductive contact plates, significantly reducing energy consumption by only energizing the electromagnets when necessary.

2. Wear and Tear

- **Problem**: Continuous operation and friction in traditional systems lead to significant wear and tear, requiring frequent maintenance and part replacements.
- **Solution**: The Carousel is designed with minimal moving parts and uses electromagnetic forces to generate motion, which reduces mechanical wear. If magnetic bearings are used there is further reduction in friction, higher speed capacity and extends the device's lifespan, and limits the maintenance and part(s) replacement which may be required.

3. Complexity and Maintenance

- **Problem**: Many rotary systems are complex and require extensive maintenance due to their mechanical complexity.
- **Solution**: The Carousel features a simple and robust design with fewer moving parts. This simplicity translates into lower maintenance requirements and easier troubleshooting.

4. Versatility and Modularity

- **Problem**: Traditional electric powered rotating engines often lack versatility and cannot be easily integrated into different configurations or systems.
- **Solution**: The Carousel can be stacked and interconnected by use of a central driveshaft and configured in multiple ways, allowing it to be used in a variety of applications. The invention also includes the capacity to be utilized with other devices by means of the exterior interchangeable gear modules .Its modular design makes it adaptable to different operational needs, such as varying torque, varying speed and other performance options.

5. Control and Precision

- **Problem**: Achieving precise control over rotary motion can be challenging with mechanical systems.
- **Solution**: The Carousel can be controlled using an external programmable PCB or integrated circuits in conjunction with the hardwired circuitry embodiments where control is regulated through and introduced by the external power applied and the analog style of the contact plates and gradient pockets. The utilization of advanced structural configurations, allowing for precise control over timing, torque, motion and other performance options. This makes it suitable for applications requiring high precision, such as robotics and laboratory automation.

6. Forward and Reverse Operation

- **Problem**: Many rotary devices are designed to operate in a single direction, limiting their functionality.
- **Solution**: The Carousel is capable of both forward and reverse operation by rearranging its internal components or utilizing a plurality of devices in conjunction, providing greater flexibility in its applications and usefulness.

7. Integration into Complex Systems

- **Problem**: Integrating rotary devices into larger mechanical systems can be difficult due to compatibility issues and mechanical constraints.
- **Solution**: The Carousel’s design allows it to be easily integrated into complex mechanical systems, including those requiring gear configurations. Its toothed track and central shaft design enable seamless integration with other units and foreign apparatus.

8. Reduced Power Spikes and Lags

- **Problem**: Power spikes and lags are common issues in systems with continuous power delivery, leading to inefficiencies and potential damage.
- **Solution**: By using intermittent power delivery, the Carousel reduces the likelihood of power spikes and lags, ensuring smoother operation and protecting the system's components.

9. Application in Advanced Technologies

- **Problem**: Existing rotary devices may not be suitable for advanced applications like animatronics and high-precision laboratory equipment.
- **Solution**: The Carousel’s precise control and robust design make it ideal for advanced technologies, where reliability and precision are critical.

Summary

The Carousel addresses numerous problems associated with traditional electric engines and carousels, providing a more efficient, durable, versatile, and precise solution. Its innovative use of electromagnetism, structural and modular design makes it a valuable component for various modern applications, from industrial machinery to cutting-edge robotics.

These solutions make the Carousel a significant advancement in the field of electromagnetism and rotary motion devices.

Micro and Macro Applications of Carousel

The versatile design of the invention Carousel, allows it to be utilized in both micro and macro applications, making it a valuable technology across a wide range of industries. Here's how it can be applied in these different scales:

Micro Applications

1. **Micro Robotics and Precision Instruments**
    - **Application**: In micro-robotics, precise control and minimal size are critical. The Carousel can be scaled down to provide high-precision rotary motion for micro-robotic joints, actuators or clocks.
    - **Advantages**: Its efficient energy usage and minimal wear make it ideal for tiny devices that need to operate reliably over long periods without frequent maintenance.
2. **Medical Devices**
    - **Application**: The Carousel can be used in medical devices such as miniature pumps, precision surgical tools, and diagnostic equipment.
    - **Advantages**: Its precision and control can enhance the performance of medical instruments, enabling more accurate diagnostics and surgical procedures.
3. **Laboratory Automation**
    - **Application**: In laboratories, the Carousel can drive micro-centrifuges, sample handlers, and automated pipettes.
    - **Advantages**: The precise control and low energy consumption are crucial for maintaining accuracy and efficiency in laboratory processes.
4. **MEMS (Micro-Electro-Mechanical Systems)**
    - **Application**: The principles of the Carousel can be adapted for MEMS devices, which are used in sensors, actuators, and other micro-scale systems.

- **Advantages**: Its ability to be integrated into complex micro-systems makes it a valuable component for innovative MEMS designs.

Macro Applications

1. **Industrial Machinery**
   - **Application**: In industrial settings, the Carousel can be used to drive large-scale machinery such as conveyor belts, robotic arms, clocks, and automated assembly lines.
   - **Advantages**: Its robust design and low maintenance requirements make it ideal for continuous operation in demanding environments.
2. **Renewable Energy Systems**
   - **Application**: The Carousel can be integrated into wind turbines and hydroelectric generators, where efficient and reliable rotary motion is essential.
   - **Advantages**: Its energy-efficient operation can help maximize the output of renewable energy systems.
3. **Automotive, Aeronautics and Aerospace**
   - **Application**: In automotive and aerospace industries, the Carousel can be used in engines, control surfaces, and energy recovery systems.
   - **Advantages**: The ability to operate in forward and reverse and its efficient energy use can enhance vehicle performance and reduce energy consumption.
4. **Heavy Machinery and Construction Equipment**
   - **Application**: The Carousel can drive components of heavy machinery such as cranes, excavators, and drilling equipment while maintaining silent drive capability.
   - **Advantages**: Its durability and energy efficiency are crucial for heavy-duty applications where reliability and operational cost savings are important.

Integration of Micro and Macro Applications

The fundamental principles of the Carousel allow it to be scaled and adapted for various applications, from the tiniest medical devices to large-scale industrial machinery. Here's how this integration works:

1. **Scalability**
    - The design can be easily scaled up or down without losing efficiency or functionality. This scalability is achieved through the modular design and the use of external programmable control systems.
2. **Customization**
    - The modular nature of the Carousel allows for customization to meet specific needs. Different configurations of the base plate (1), mounting plate (2), head module (3), and cap module (8) can be used to optimize performance for the intended application.
3. **Energy Efficiency**
    - Across both scales, the energy-efficient design of the Carousel reduces operational costs and enhances sustainability. This is particularly important in applications where power availability is limited or where energy costs are a significant concern.
4. **Durability and Low Maintenance**
    - The robust design ensures long-term reliability with minimal maintenance, which is a critical advantage in both micro and macro applications where downtime can be costly or detrimental.

CLAIMS
carousel

1. **An electromagnetic engine comprising:**
    - a base plate module (1) constructed from a durable material, the base plate module (1) housing a plurality of electromagnet modules (5) arranged in concentric rings;
    - a mounting plate module (2) comprising a plurality of conductive contact plates (13) aligned with electric terminal modules (15) on the base plate module (1);
    - a head module (3) comprising gradient shoes (10) embedded in channels (12), the gradient shoes (10) interacting with magnetic fields generated by the electromagnet modules (5);
    - a head module (3) comprising gradient pockets(11) embedded in channels (12), the gradient pockets(11) interacting with magnetic fields generated by the electromagnet modules (5);
    - a cap module (8) securing the head module (3) to the mounting plate module (2) through fasteners positioned in hollow cylindrical fastener shafts (9);
    - wherein the conductive contact plates (13) intermittently contact the electric terminal modules (15) to energize the electromagnet modules (5), thereby inducing a rotary motion in the head module (3).
2. **The electromagnetic engine of claim 1,** wherein the electromagnet modules (5) are arranged in one or more concentric rings and spaced equidistantly to ensure uniform magnetic interaction.
3. **The electromagnetic engine of claim 1,** wherein the gradient shoes (10) vary in width to create a path of least resistance, thereby facilitating smooth rotary motion.
4. **The electromagnetic engine of claim 1,** wherein the gradient pockets (11) vary in width to create a path of least resistance, thereby facilitating rotary motion.
5. **The electromagnetic engine of claim 1,** further comprising a central shaft passing through a shaft cut-out () in the head module (3), the central shaft enabling the stacking of multiple units for complex mechanical operations.

6. **The electromagnetic engine of claim 1,** wherein the head module (3) is slightly smaller in diameter than the base plate module (1) and the mounting plate module (2), thereby fitting within the peripheral edges (17) of the mounting plate module (2) and the base plate module (1).
7. **The electromagnetic engine of claim 1,** wherein the cap module (8) includes a peripheral edge (16) that extends slightly down the sides of the head module (3), thereby ensuring secure positioning.
8. **The electromagnetic engine of claim 1,** wherein the conductive contact plates (13) deliver power to the electromagnet modules (5) only when in contact with the electric terminal modules (15), thereby reducing energy consumption.
9. **The electromagnetic engine of claim 1,** wherein the engine is configured to operate in both forward and reverse directions by rearranging the internal components.
10. **The electromagnetic engine of claim 1,** wherein the mounting plate module (2) and head module (3) include a plurality of channels (12) cut through them in concentric rings, allowing the electromagnet modules (5) to pass through unobstructed.
11. **The electromagnetic engine of claim 1,** wherein the mounting plate module (2), and cap module (8) all have equal and matching diameters, ensuring proper alignment and operation.
12. **The electromagnetic engine of claim 1,** wherein the base plate module (1) further comprises magnetic bearings in its stability track to reduce friction and wear, thereby enhancing the engine's longevity.
13. **The electromagnetic engine of claim 1,** configured for use in robotics, animatronics, laboratory automation, and industrial machinery, providing precise control and durable operation.
14. **The electromagnetic engine of claim 1,** wherein the mounting plate module (2) includes a plurality of channels (12) that align with the electromagnet modules (5) and conductive contact plates (13), thereby ensuring smooth interaction and motion.
15. **The electromagnetic engine of claim 1,** wherein the head module (3) comprises channels (12) designed to match the arrangement of electromagnet modules (5) and conductive contact plates (13) for optimal performance.

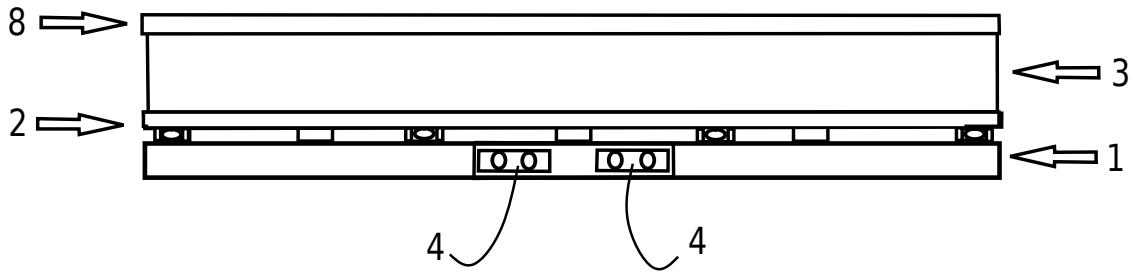
16. **The electromagnetic engine of claim 1**, wherein the pockets (11)located in the head module(3) can be made of varied structural attributes to create varied operational performance ratings.
17. **The electromagnetic engine of claim 1**, wherein the device has the option to attach interchangeable gears which traverse the peripheral of the device.
18. **The electromagnetic engine of claim 1,** wherein the power can be derived from a central driveshaft attached to the center of the invention.
19. **The electromagnetic engine of claim 1,** wherein the device is configured to operate in both forward and reverse directions by stacking of multiple units upon itself while utilizing the same driveshaft.

Carousel abstract

Abstract:

The Carousel is an analog electromagnetic drive system and self contained gear system in one. It is designed to work independently or with multiple units, utilizing a central driveshaft or it can be used in a gear configuration by means of its interchangeable toothed gear track. The Carousel can deliver movement through its centralized shaft system as well as its interchangeable exterior gearing. Power can be diverted simultaneously or independently. The unit is powered by electricity and offers easy setup. The simple design offers reliable turning over long periods of time. The Carousel can also be controlled by means of external programmable digital P.C.B., or with external Integrated Circuit technology or like technology. The Carousel is a versatile and scalable rotary engine that can be applied in both micro and macro contexts. Its energy efficiency, precision control, and low maintenance make it suitable for a wide range of applications, By leveraging its modular design, the Carousel can be adapted to meet the specific needs of diverse industries, making it a revolutionary technology in the field of electromagnetism and rotational motion devices.

Fig.1A



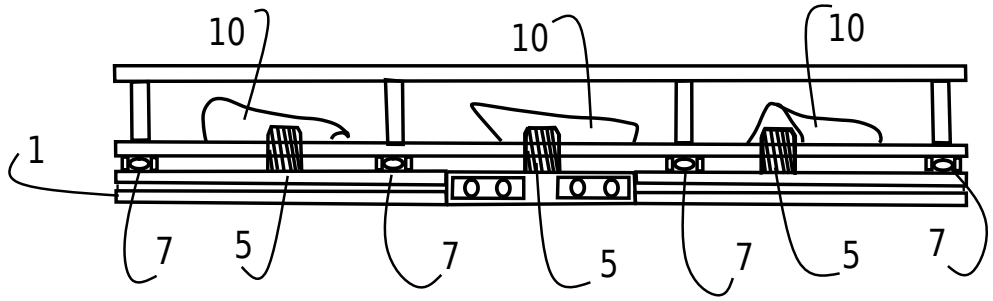


Fig.1B

Fig.2

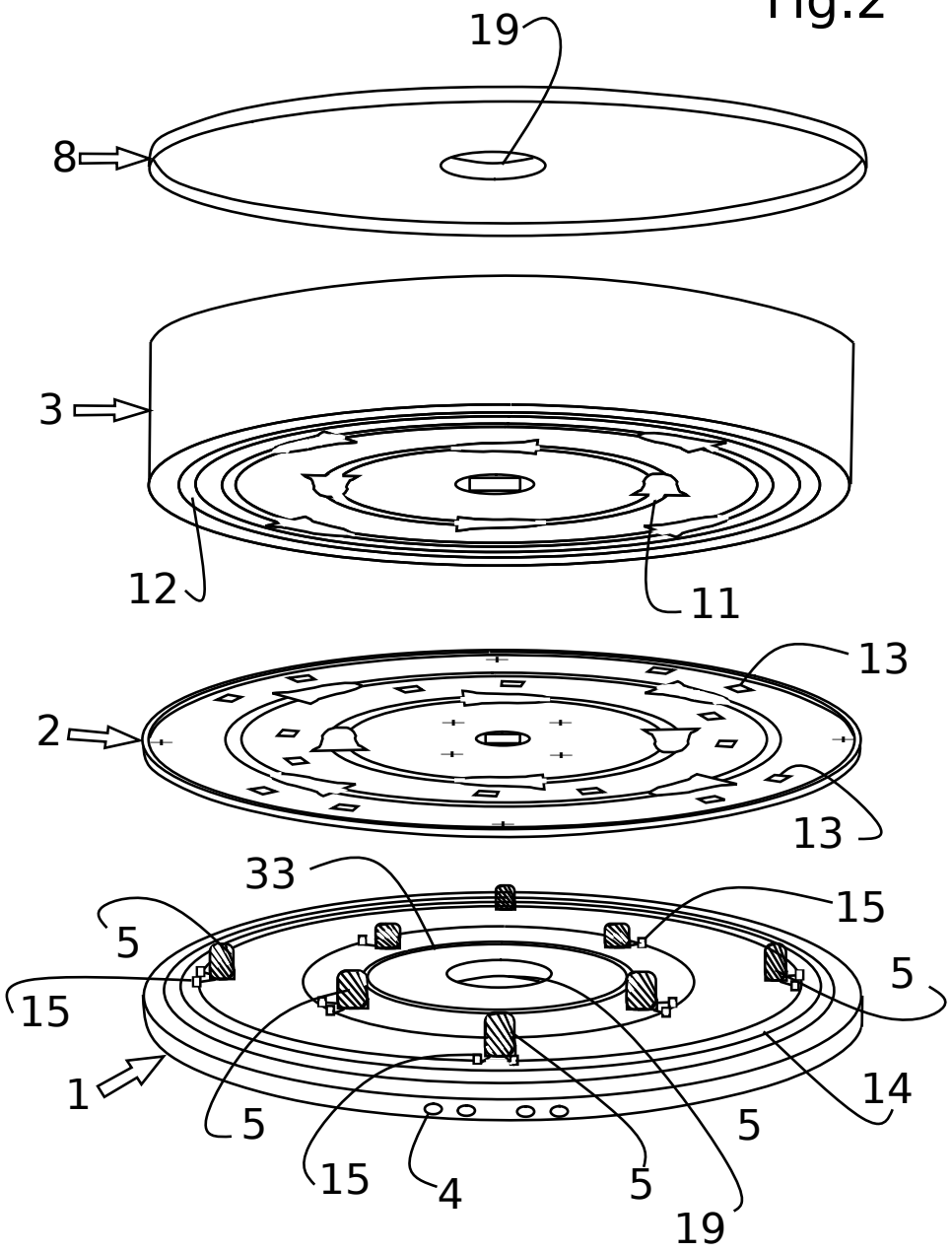


Fig.3A

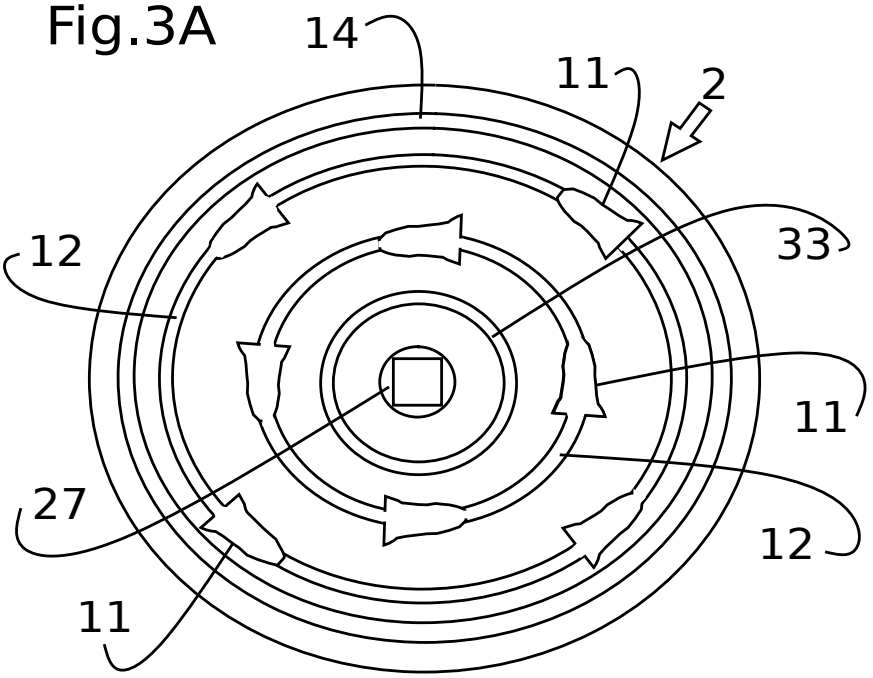
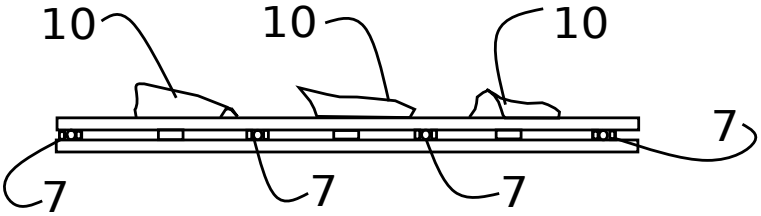


Fig.3B



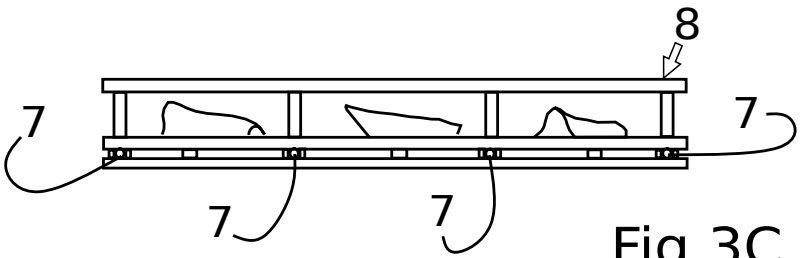


Fig.3C

Fig.4A

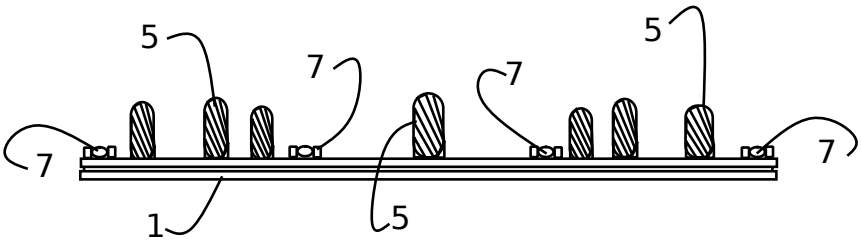


Fig.4B

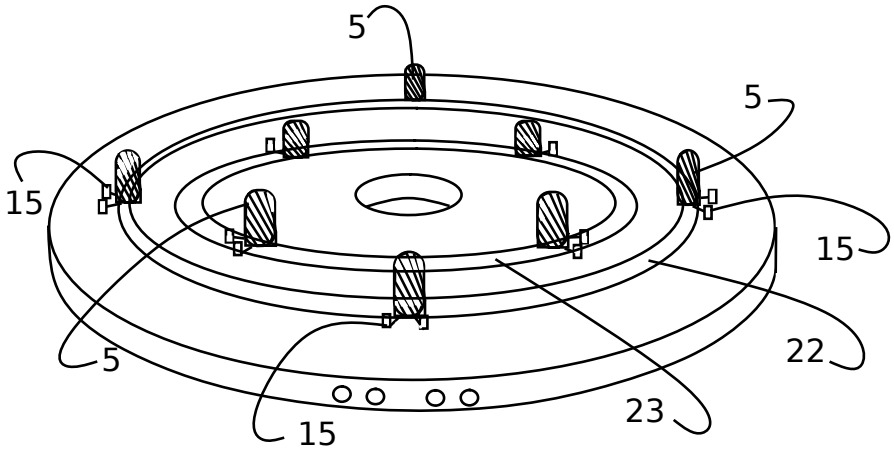


Fig.5

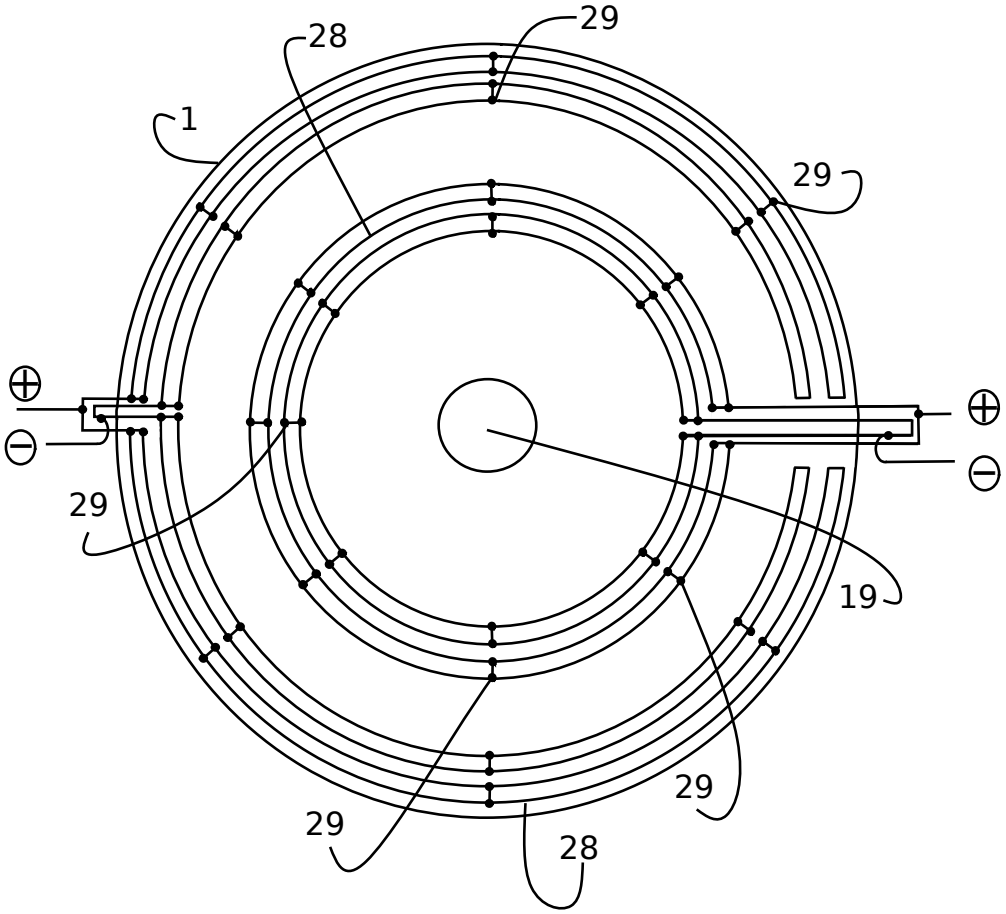


Fig.6A

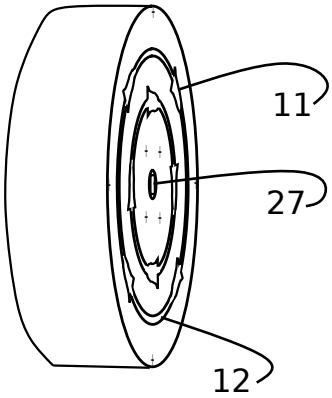
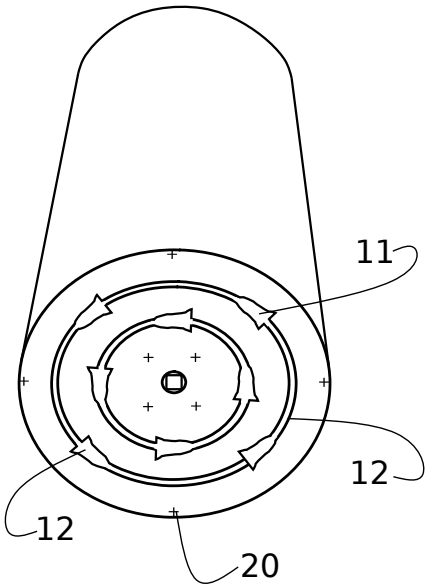


Fig.6B



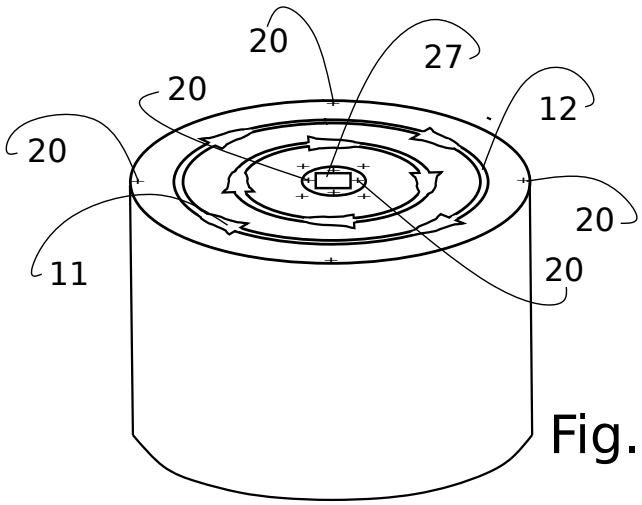


Fig.6C

Fig.7A

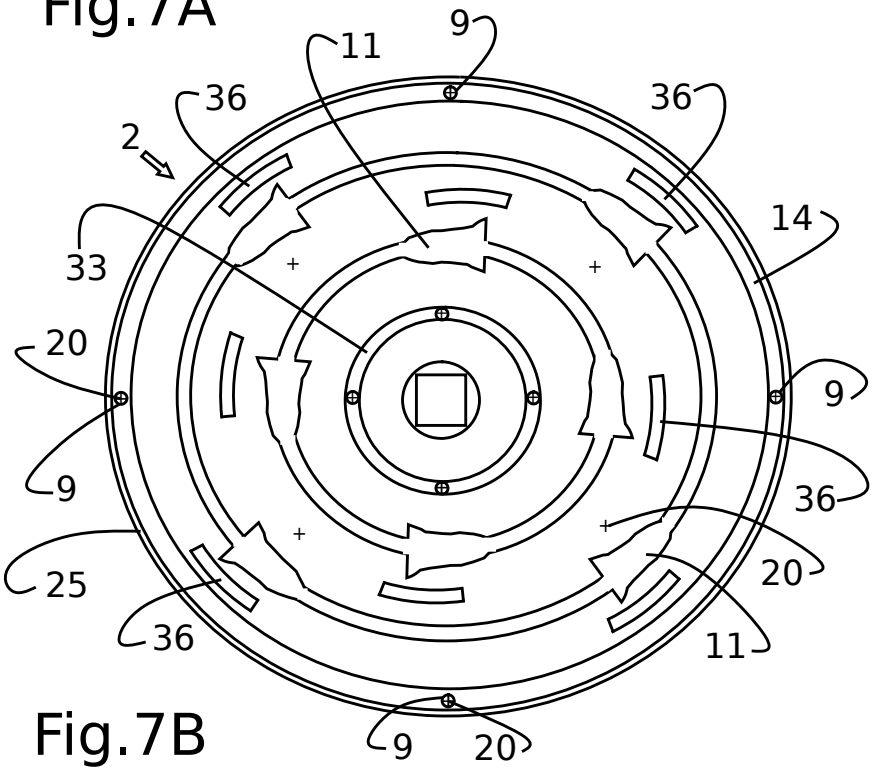


Fig.7B

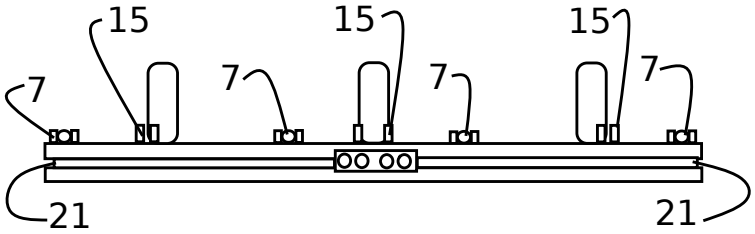


Fig.7C

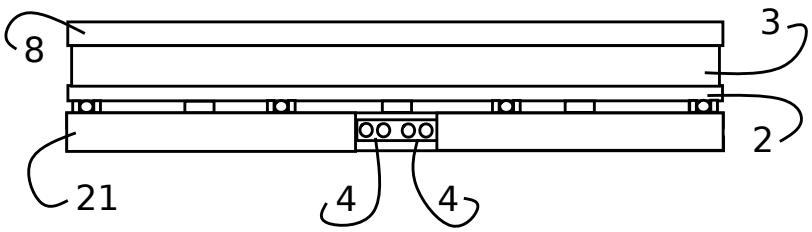


Fig.8A

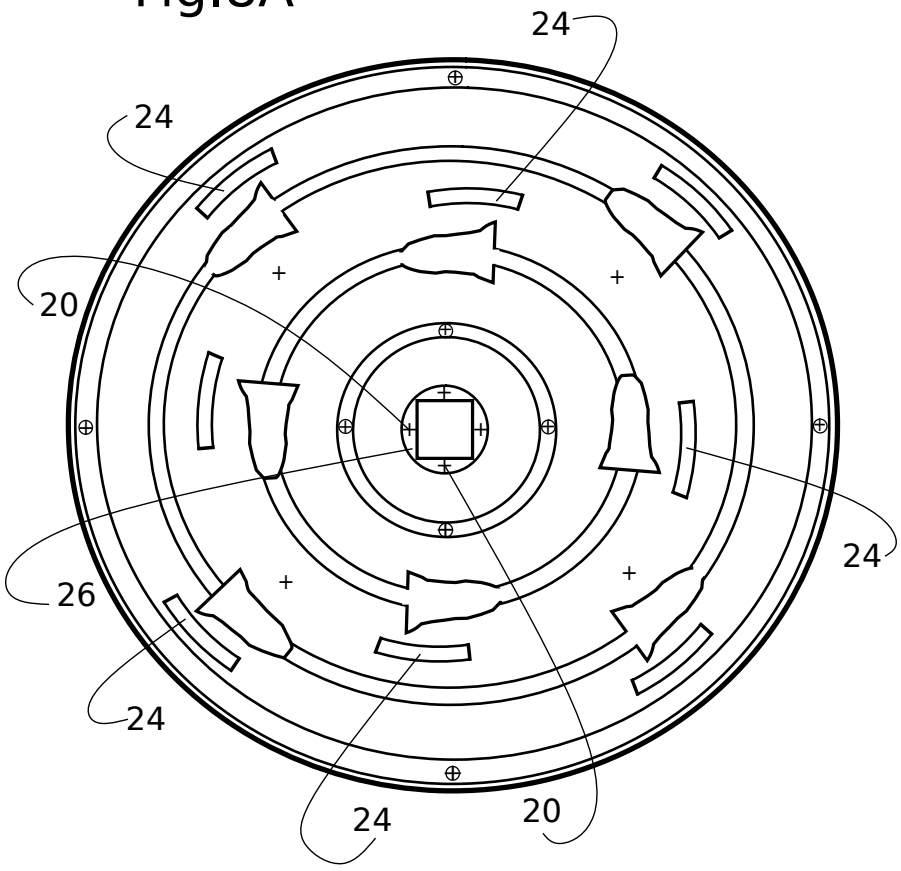


Fig.8B

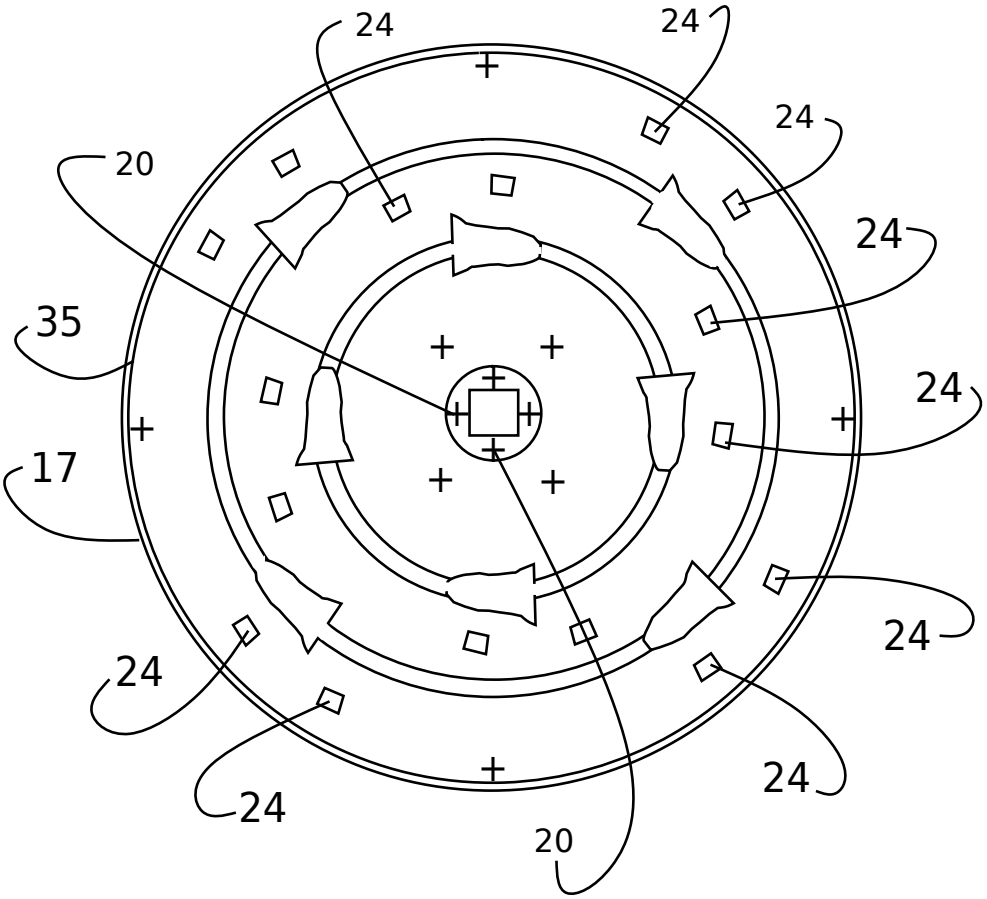


Fig.9A

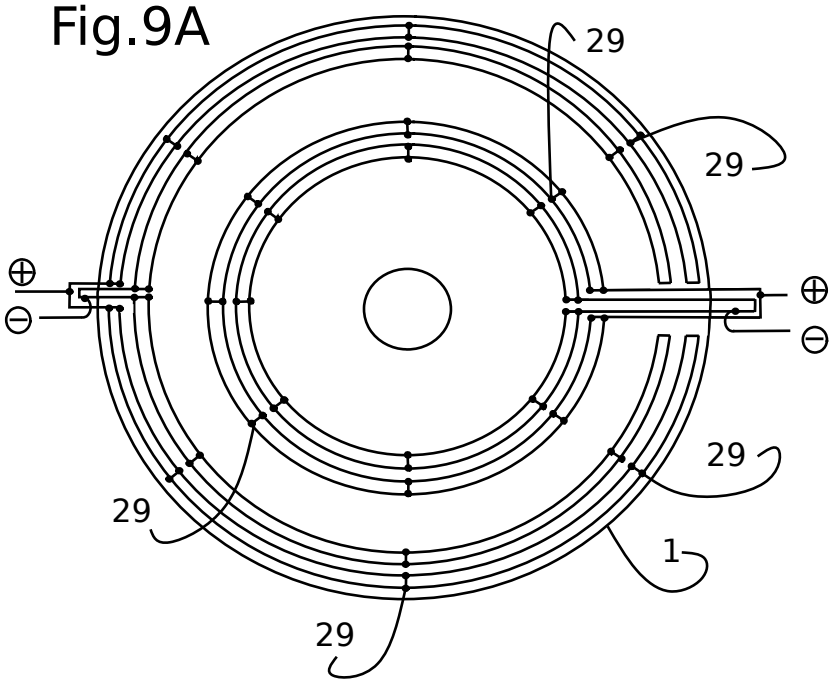


Fig.9B

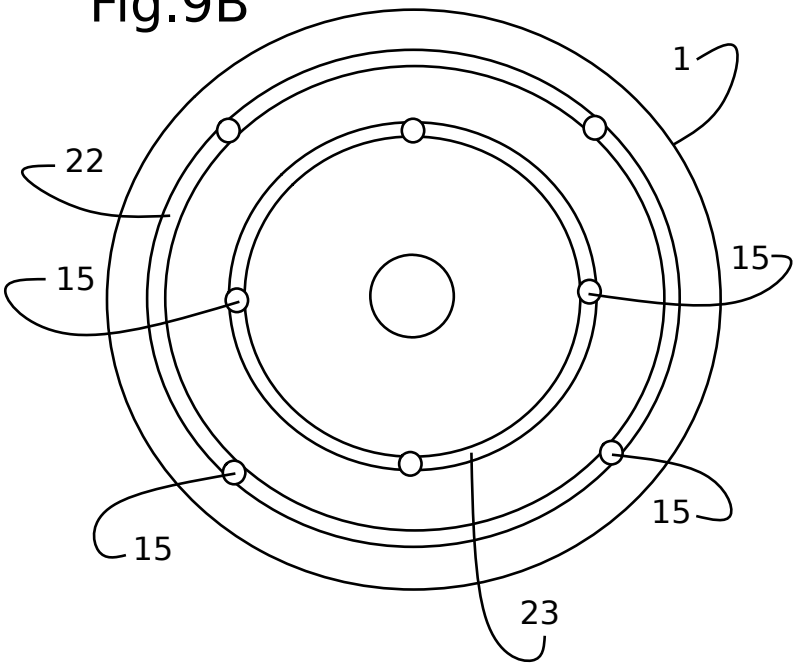


Fig.10A

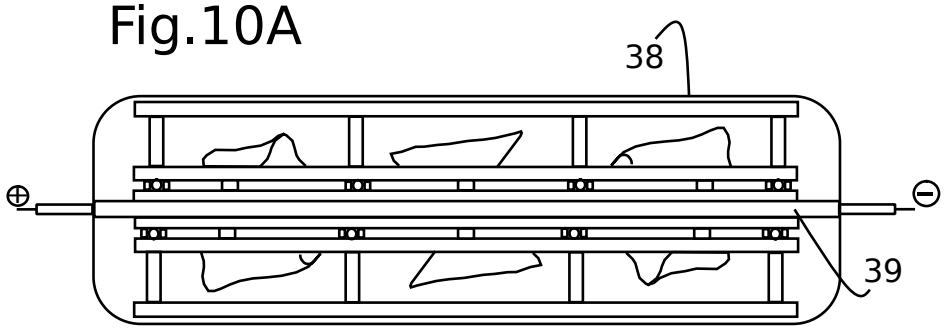


Fig.10B

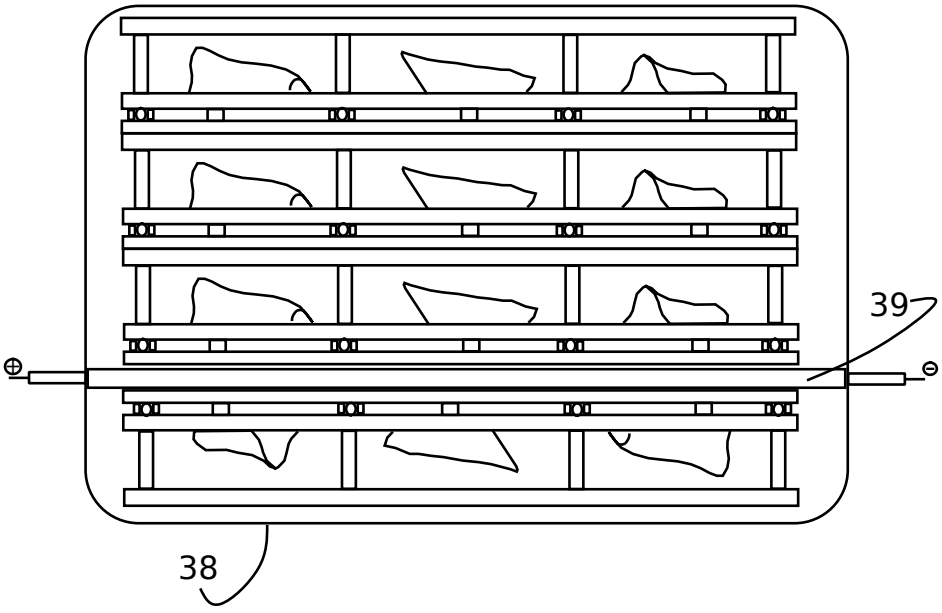
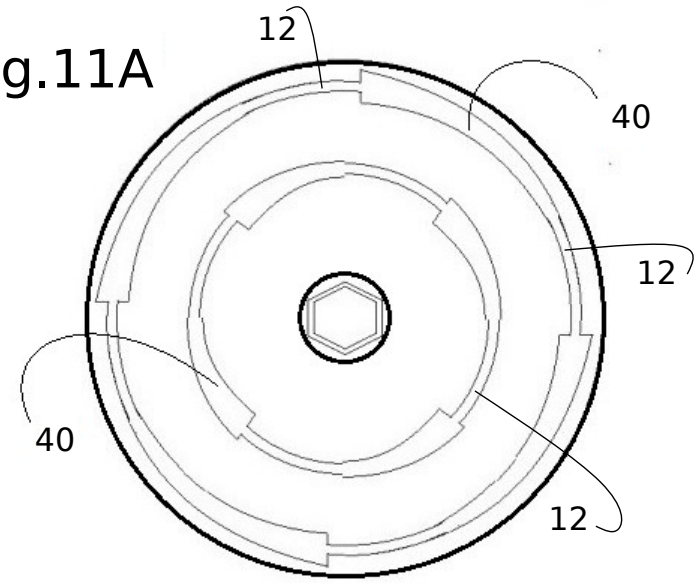


Fig.11A



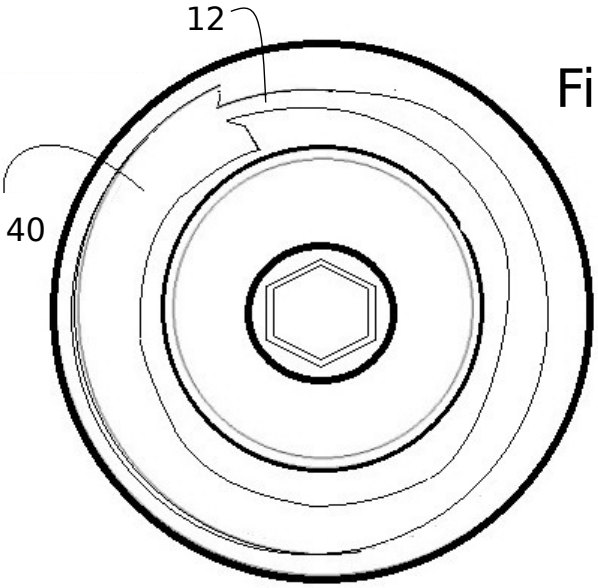


Fig.11B

Fig.11C

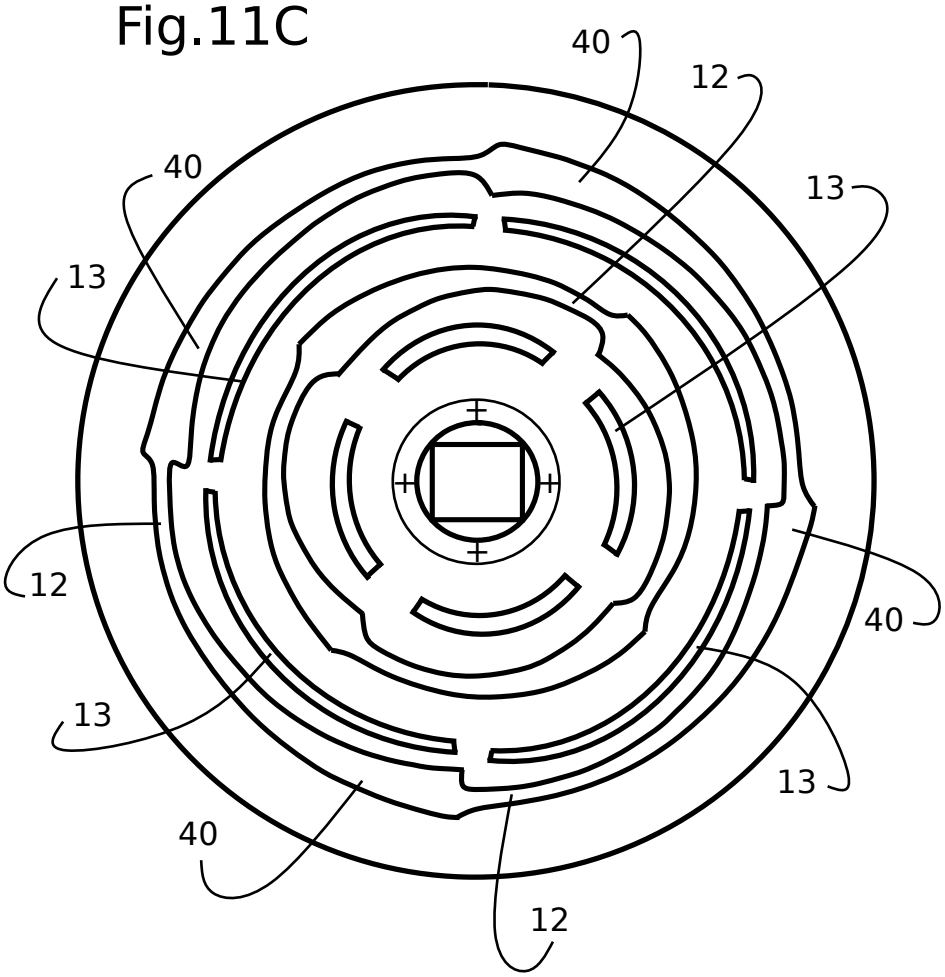


Fig.12A

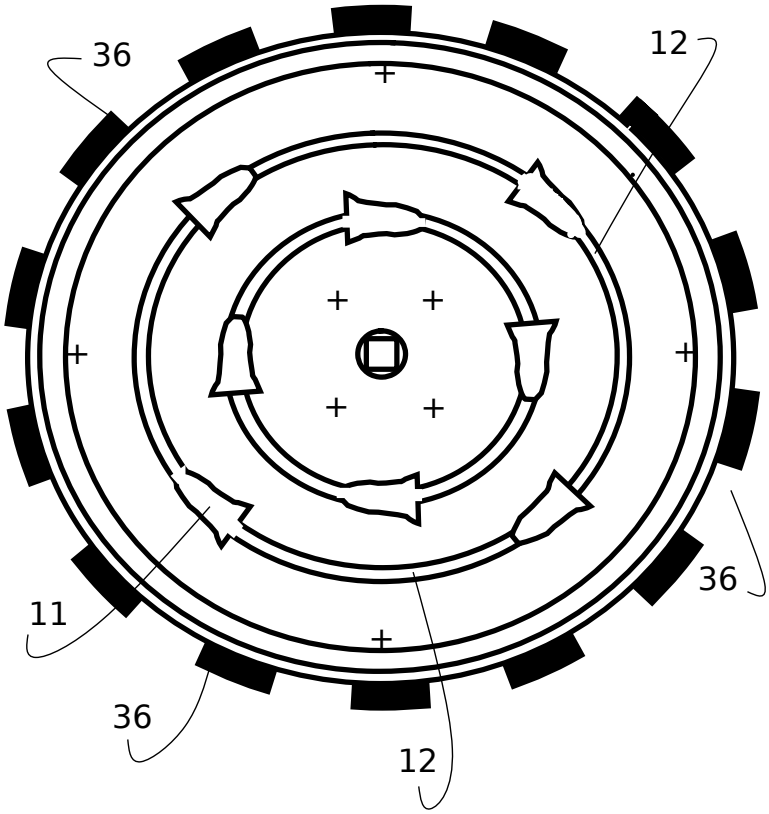


Fig.12B

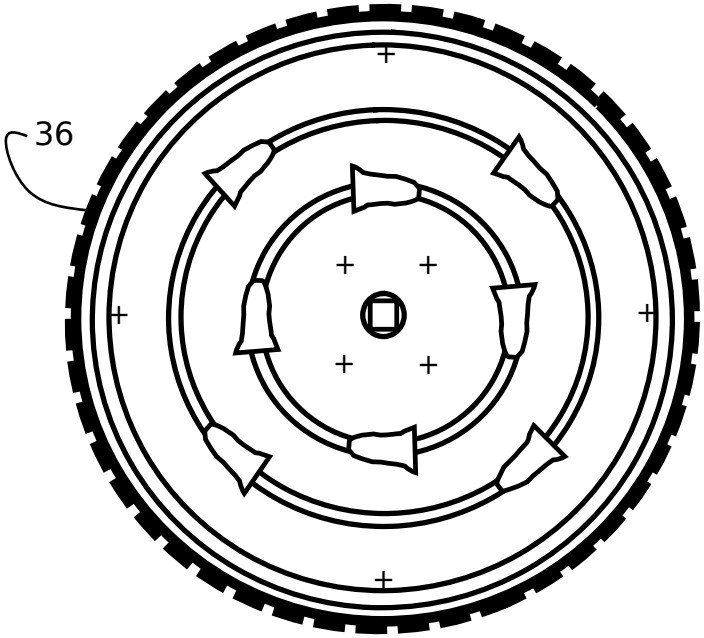
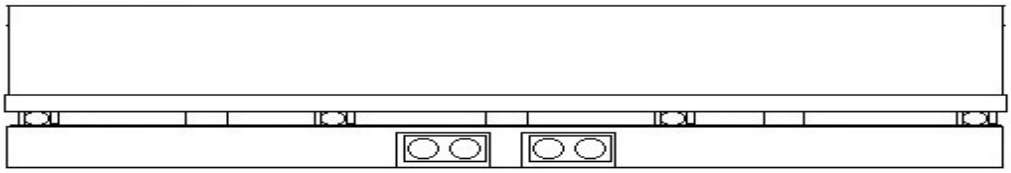


Fig.13A



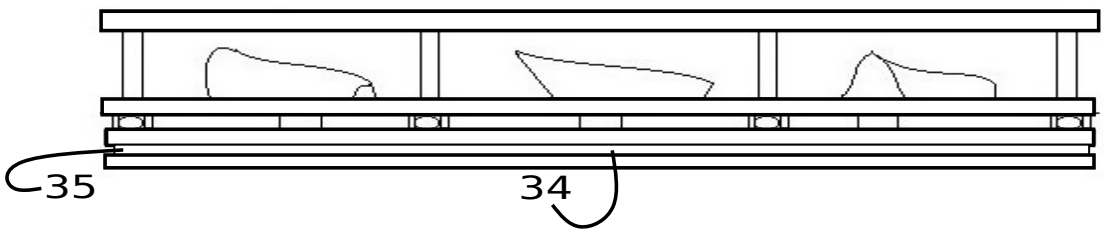


Fig.13B